**Unit Plan**

**Logistics Information**:

* 1. Grade Level: 10-12
  2. Course Name: Chemistry
  3. Instructor: Christopher Bauer

**Background Information**:

Describe your classroom. What would an observer need to know about the learners in your classroom and the climate/culture of your school? Describe this course in the sequence of a student’s learning career – where does it fit?

This classroom is in a low income school. The student population is very diverse and many students are ELL students.The classroom is arranged so that students are seated in groups. The groups will be made of students with varying abilities. Students in these groups work together through cooperative learning to come up with ideas about the objectives together and to facilitate in the whole groups learning. The climate of the school is one in which standardized test scores are in need of improvement.**Unit Name: Project gas Approximate Length**: 10 50 minute days

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| **Enduring Understanding(s)**   * Gas particles are far apart and move fast to exert pressure. * When a liquid or solid turns to gas, mass is conserved. * Gases behave according to gas laws. | |
| **Essential Question(s)**   * What is gas? * How does gas behave? * What is the relationship between gas, energy (temp), pressure, and volume? | |
| **Content:**   * Understands and applies knowledge of interactions of energy and matter   -The input of energy determines the behavior of gases   * Understands and applies knowledge of the structures and properties of matter   - The structure and properties of gases will be explored in-depth | **Skill(s):**   * Students will be able to apply gas laws to problems * Students will be able to convert units of pressure, temperature, volume from moles. * Students will be able to illustrate their knowledge of gas and its behavior with relation to the changing of variables in pressure, volume, amount in moles, and temperature. |
| **Assessment(s)**  Gas in our lives and history project. Lab report.  Annotated student drawings.  Completed study guides.  Mini-test | |
| **Additional Resources**  **Google docs, balloons, bouncy balls, lab equipment, class computers,** | |

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| **Day One** | | | |
| **Phase of the Lesson –**  **Engage Explore**  **Explain Elaborate Evaluate** | **Reason/Rationale for this Activity OR Goal for this Activity** | **Description of Learning Activity (include approximate time allocation)** | **Evidence of Student Understanding** |
| Engage  Explore | -Students will generate question about gas and how it behaves.  -Misconceptions and prior knowledge will be assessed.  - Generate interest in topic. | -Start with “what comes to mind when you hear gas?”(5 min)  - Groups generate KWL.(7min)  - Respond to “compu-com” difference between gas and air  (7 min)  -Students hypothesize what will happen with balloons in hot and cold water. Conduct balloon experiment. Quick write in journals (15)  -during balloon bath, a beaker of water will be evaporated at the front of the class. Students will draw their interpretation of what happens to water after it has evaporated (draw their interpretation of gas). Talk and share with their group about their ideas. (same 15 as above)  -Group writes up questions about gas, 1 question per group member. They will keep these questions out on their tables throughout the unit and write the answers in their journals as they are answered. (16 min) | -Balloon write ups in journals  -Students drawing of their interpretations of gas.  -Text poll  -Group discussion |
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| **Day Two** | | | |
| **Phase of the Lesson –**  **Engage Explore**  **Explain Elaborate Evaluate** | **Reason/Rationale for this Activity OR Goal for this Activity** | **Description of Learning Activity (include approximate time allocation)** | **Evidence of Student Understanding** |
| Explain  Evaluate | Introduce the basic properties of gases and the units that will be used in the gas laws | -Start class with discussion of what are some properties of gas. Ideas generated through “compu-com”. (8 min)  -Talk about basic properties of gas and about the units that are used to measure gas. Properties of gases are related to bouncy balls in table groups and ideas are shared with the whole class. 10min  -Kinetics explained through lecture (10 min)  - States of matter and their relationship with energy is discussed. Bouncy ball experiment in table groups. No energy, ball is stationary, little energy, ball shifts, high energy ball bounces under table. Concept webs created by students with matter in the middle and states of matter branched off. Relate the energy involved in each state of matter and their properties. 12 min  -computer exploration with website to introduce students to the concepts that will be taught  <http://www.mhhe.com/physsci/chemistry/essentialchemistry/flash/gasesv6.swf>  10min | -Sign off on student study guides/notes.  -Class participation  -Phone poll  -Concept webs |
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| **Day Three** | | | |
| **Phase of the Lesson –**  **Engage Explore**  **Explain Elaborate Evaluate** | **Reason/Rationale for this Activity OR Goal for this Activity** | **Description of Learning Activity (include approximate time allocation)** | **Evidence of Student Understanding** |
| Engage  Explore  Explain  Elaborate | An explanation of pressure. Fruit snacks will be used as a way to engage students. This lesson will elaborate on pressure that was introduced in an earlier lesson. | -Start class with fruit snack demo. One pack of fruit snacks will be given to each table group. Students will be told to wait on eating them until we are done. Students will press lightly on their snacks and jot down their observations in their journals. Students will then press on the snacks as hard as they can this time noting what happens during and after the pressure has been applied. 7 min  - discuss the atmosphere and barometers. Use this to go into units of pressure. Atmosphere and torr. 8 min  -groups try to figure out a conversion problem and post answer to “compu-com.” Each group does a think aloud about their process and turns in their work. Work through more on board. 15 min  -groups will be given scenarios to draw. Each member must draw one on their own and turn in at the end of class 20 min | -Journal entries  - text poll  -think-alouds  -conversion work  -annotated drawings |
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| **Day Four** | | | | | |
| **Phase of the Lesson –**  **Engage Explore**  **Explain Elaborate Evaluate** | **Reason/Rationale for this Activity OR Goal for this Activity** | | **Description of Learning Activity (include approximate time allocation)** | | **Evidence of Student Understanding** |
| Explain  Elaborate | This lesson will set a purpose to concepts of pressure, volume and temperature that we discussed earlier. This lesson will introduce Boyle’, Charles’, Gay-Lussac’s, and the combined gas law. The emphasis will be placed on the combined gas law. | | -discuss the conditions of Boyle’s law and compu-com  (8 min)  - Discuss Charles’ laws conditions  (5 min)  -Discuss and derive Gay-Lusac’s law from knowledge of the other 2 laws. Draw or write ideas. (10 min)  -Discuss and go over the equation for the combined gas law. (7 min)  -practice problems and review of laws (20 min) | | -Compu-coms  -Student drawing  -Group worked problems |
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| **Day Five** | | | |
| **Phase of the Lesson –**  **Engage Explore**  **Explain Elaborate Evaluate** | **Reason/Rationale for this Activity OR Goal for this Activity** | **Description of Learning Activity (include approximate time allocation)** | **Evidence of Student Understanding** |
|  | -This lab will be a way to take the information learned and apply it hands on. | -Students will perform experiments from the link below and use the gas demo box that will be set up at different stations around the class  -Students will write their reports addressed to Chem-Puter in google docs.  -As a group, lab reports are to include all data from the labs that the groups find to be relevant and will be encouraged to create visuals to accompany their reports.  -As individuals, group members are to write their own conclusions to add to the google docs.  <http://tides.sfasu.edu/teachers/LessonPlans/Laura%20Verastegui/VerastuguiGasLaws.pdf>  -Remaining class time will be spent going over practice problems and introducing the students unit project. | -Lab reports and student participation |
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| **Day Six** | | | |
| **Phase of the Lesson –**  **Engage Explore**  **Explain Elaborate Evaluate** | **Reason/Rationale for this Activity OR Goal for this Activity** | **Description of Learning Activity (include approximate time allocation)** | **Evidence of Student Understanding** |
| Elaborate  Explain  Evaluate | -Avogadro’s law will be presented as an extension to the combined gas law to build on prior knowledge. The use of STP will be introduced | - Avocados will be placed on group desks. “Who knows what these are?” This will be an engagements activity to get students ready for Avogadro’s law. (3min)  -Students will discuss the meaning of Avogadro’s law in their group by interpreting the formula (9min)  - Problem will be worked out and answered on Compu-Com (8 min)  -STP introduced and conversions calculated on quick writes (10 min)  - Molar volume and STP conversions covered and then book problems are worked. (20 min) | - Formula quick writes  - Compu-Com |
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| **Day Seven** | | | |
| **Phase of the Lesson –**  **Engage Explore**  **Explain Elaborate Evaluate** | **Reason/Rationale for this Activity OR Goal for this Activity** | **Description of Learning Activity (include approximate time allocation)** | **Evidence of Student Understanding** |
| Engage  Explore  Elaborate  Evaluate | -This will give students the chance to explore the topic of gases with lots of freedom to personalize their learning of the subject.  -this will give me a chance to float around the groups to find out their understanding of subject and to see if there are any students that need any extra help. | -This day will be used for groups to work on their presentations  -Students will do research, come up with a plan, and do whatever else needs to be done for their projects  -Project ideas must be set and approved by the teacher by the end of the class period. | -Production of the unit project  -An approved topic submitted by the end of the class period |
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| **Day Eight** | | | |
| **Phase of the Lesson –**  **Engage Explore**  **Explain Elaborate Evaluate** | **Reason/Rationale for this Activity OR Goal for this Activity** | **Description of Learning Activity (include approximate time allocation)** | **Evidence of Student Understanding** |
| Engage  Explore  Explain  Evaluate | -Ideal gas laws are introduced  -Students are allowed to explore the law through the online activity. Use of technology to engage and change instruction. | -Run through definition of Ideal Gas Law in PPT  -go over a few problems in the book.  -Groups work at computer and choose scenarios to experiment with and write up on Google docs.  - Choose from these and work out how to simplify the activity or create their own. Gifted students may try these experiments and current level. <http://intro.chem.okstate.edu/2001ACS/MoLEGasLawManual.pdf>  -use this to experiment <http://intro.chem.okstate.edu/1314f00/laboratory/glp.htm> | - Google docs  -Participation  -Worked problems |
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| **Day Nine** | | | |
| **Phase of the Lesson –**  **Engage Explore**  **Explain Elaborate Evaluate** | **Reason/Rationale for this Activity OR Goal for this Activity** | **Description of Learning Activity (include approximate time allocation)** | **Evidence of Student Understanding** |
| Engage  Explain  Elaborate  Evaluate | -Learn partial pressures  -Unit review problems | -Daltons law will be introduced on PPT  -The gas demo box will be brought out and groups will draw in stages what will happen to the pressure when the divider is lifted while the balls are bouncing  -A few partial pressure problems from the book will be worked on the board  -the rest of the class will be spent working on problems from the unit to review for the unit test. | -Student Drawings  -Student participation and questions during review time |
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| **Day Ten** | | | |
| **Phase of the Lesson –**  **Engage Explore**  **Explain Elaborate Evaluate** | **Reason/Rationale for this Activity OR Goal for this Activity** | **Description of Learning Activity (include approximate time allocation)** | **Evidence of Student Understanding** |
| Elaborate  Explain  Evaluate | Students get to share their knowledge with the class and will learn the human aspect to the topic as well as what some real world uses are for gases. This will make the subject relevant to the students. | -Students will present their projects on the history behind our knowledge about gases and about some real world uses of the knowledge we covered in this unit.  -groups will be assigned to do peer evaluations on another group presentation and on the participation of their group members.  -These projects will be addressed directly to Chem-Puter as their final report for the mission before the unit test. | -Students project presentations  -Peer evaluations |
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